UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

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First Inventor or Application Identifier	Jason A. Kronz
Title	HIDDEN AGENT TRANSFER PROTOCOL
Express Mail Label No.EL	235890546 US

APPLICATION ELEMENTS
See MPEP chapter 600 concerning utility patent application contents

ADDRESS TO: **Assistant Commissioner for Patents, Box Patent Application, Washington, DC 20221**

1. ☒ • Fee Transmittal Form (e.g., PTO/SB/17) (Submit an original and a duplicate for fee processing)
2. ☒ Specification [Total Pages 34] (preferred arrangement set forth below)
   - Descriptive title of the Invention
   - Cross References to Related Applications
   - Statement Regarding Fed. Sponsored R & D
   - Reference to Microfiche Appendix
   - Background of the Invention
   - Brief Summary of the Invention
   - Brief Description of the Drawings (if filed)
   - Detailed Description
   - Claim(s)
   - Abstract of the Disclosure
3. ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets 4]
4. Oath or Declaration [Total Pages 1]
   a. ☒ Newly executed (original or copy)
   b. ☐ Copy from a prior application (37 C.F.R. § 1.63(d)) (for continuation/divisional with Box 16 completed)
      1. ☐ DELETION OF INVENTOR(S) Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b)

*NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.29).

5. ☐ Microfiche Computer Program (Appendix)
6. Nucleotide and/or Amino Acid Sequence Submission (if application, all necessary)
   a. ☐ Computer Readable Copy
   b. ☐ Paper copy (identical to computer copy)
   c. ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. ☒ Assignment Papers (cover sheets & documents))
8. ☐ 37 C.F.R. § 3.73(b) Statement ☒ Power of (when there is an assignee) ☐ Attorney
9. ☐ English Translation Document (if applicable)
10. ☐ Information Disclosure Statement (IDS)/PTO-1449 ☐ Copies of IDS ☐ Citations
11. ☐ Preliminary Amendment
12. ☒ Return Receipt Postcard (MPEP 503) Should be specifically itemized)
    * Small Entity
13. ☐ Statement(s) ☐ Statement filed in prior application (PTO/SB/09-12) Status still proper and desired
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15. ☒ Other: Verified Statement Claiming Small Entity

16. **If a CONTINUING APPLICATION,** check appropriate box, and supply the requisite information below and in a preliminary amendment.
☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No. ____/____
Prior application information: Examiner Group/Art Unit: ____

FOR CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application or Patent of: Jason A. KRONZ	§
	§
Application or Patent No.: Unassigned	§
	§
Filed: Unassigned	§
	§
For: HIDDEN AGENT TRANSFER PROTOCOL	§

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9 (f) AND 1.27 (c)) - SMALL BUSINESS CONCERN

I hereby declare that I am:

( ) the owner of the small business concern identified below:
(x) an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: Convergence Corporation

ADDRESS OF CONCERN: 270 Scientific Drive, Suite 10, Norcross, Georgia 30092

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41 (a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal years, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above, with regard to the invention entitled **HIDDEN AGENT TRANSFER PROTOCOL** by inventor **Jason A. Kronz** described in

(XX) The specification filed herewith
( ) Application No. _____, filed _____
( ) patent No. _____, issued _____

The rights held by the above identified small business concern are exclusive.

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: Mr. Charles Napier
TITLE OF PERSON OTHER THAN OWNER: Vice President
ADDRESS OF PERSON SIGNING: 270 Scientific Drive, Suite 10, Norcross, Georgia 30092

DATE 5-18-99 **SIGNATURE** Charles Napier

HIDDEN AGENT TRANSFER PROTOCOL

RELATED APPLICATIONS

This application is related to U.S. Application Serial No. __/_____, entitled "Universal Protocol for Enabling a Device to Discover and Utilize the Services of Another Device," filed on _____ and assigned to Convergence Corporation, the assignee of the present application.

BACKGROUND

Data transfer protocols are used to facilitate communication between electronic devices by providing a common set of rules by which data may be exchanged between one device and another. A universal protocol could theoretically allow one device to communicate with any other device, from simple devices like the lights in a room to complex devices like personal computers. However, to approach such an ideal, the protocol itself has to be usable with at least a significant proportion of the devices. Different types of devices have different characteristics such as microprocessor abilities, free memory, and accompanying costs. In addition, consumer devices are produced by a wide variety of manufacturers. Coordination and cooperation in interfacing a wide variety of electronic devices is very difficult.

Many times in the past, manufacturers have made attempts to allow consumer level devices to be able to communicate meaningful data or commands to one another. Many protocols define data links between standard small devices. However, this also meant that usually the "standard" became

only a standard for that genre of device. Further, while these protocols provide a data link, they do not provide a standard method to allow simple relevant information transfer between two small devices. For example, a typical pager cannot send control information to any particular cellular telephone requesting the cellular telephone to initiate a call to a certain number; a "caller-ID" box is not able to instruct a PDA to display all the contact information for the person who is calling; and a PDA cannot print or fax (without a modem or special drivers).

The inventor of the present invention has developed a protocol and method to facilitate communication between various electronic devices and the sharing of features, functionality and information between these devices which has been described in the invention, U.S. Application Serial No. __/_____, entitled, "Universal Protocol for Enabling a Device to Discover and Utilize the Services of Another Device," the entirety of which is incorporated herein by reference. This universal protocol is known as the Service Discovery Transport Protocol ("SDTP").

For background information helpful in understanding the present invention, a description of SDTP follows. SDTP is a protocol for facilitating communication between various electronic devices and the sharing of features, functionality and information between these devices. In general, SDTP is a protocol by which one device (the "client device") can discover what services are offered by another device (the "server device"). Utilizing this protocol, the client device can take advantage of the services of the server device. Advantageously, the SDTP is simple enough to be used by nearly any type of electronic device, but at the same time it is robust enough to allow a user to author high-level applications utilizing multiple different services available from multiple devices without requiring the user to have any knowledge of any particular device interface or how the device works. SDTP is capable of use by

a wide range of consumer devices allowing them to interact by standardizing many of the normal tasks associated with these devices. SDTP provides a simple data link between these devices.

The operation of SDTP actually begins when the server device sends a message to the client device to inform the client device that it is capable of communicating using the protocol. This message and all subsequent messages may be sent using standard 8-bit ASCII characters. Once the client device determines that the server device is capable of communicating using the protocol, the client device may request the server device to identify what kinds of services the server provides. This request is performed by transmitting a type-command to the server device.

Upon receiving the type-command, the server device responds by transmitting one or more device/service identifiers back to the client device. Each device/service identifier is unique, and represents either a specific device type identification ("ID"), such as a thermostat, a door, a pager, a PDA or many others, or a specific service type identification ("SD"), such as the ability to raise the temperature of the thermostat or to transmit the messages stored in the pager. Finally, the server device transmits a standard ASCII sequence to signal the last of the device/service identifiers.

After the server device identifies itself as being capable of using the protocol, the client device may issue commands to the server device using the unique service identifiers just described. Any necessary parameters may be passed along as well. If everything operates correctly, the service identified by the command is then provided by the server device. Finally, the server device responds to each such command by sending a status code back to the client device. The status code denotes that either: (a) the requested service was unavailable; (b) the server device was unable to complete the operation; (c) the

command contained a syntax error; or (d) that the operation completed successfully.

SDTP also supports "learning" new services with which the client is not previously familiar. To invoke this capability, the client device transmits a use-command to the server device to identify the service that the client wishes to learn. Upon receiving the use-command, the server device transmits a service identifier corresponding to the new service and any available parameters. The client device may then invoke the service by sending the service identifier and the requisite parameters.

As the above description of the applicant's SDTP invention shows, attempts have been made in the past to allow various consumer level devices to communicate with one another across a room or perhaps even from room to room within a house; however, there has not been available a method for facilitating communication between consumer devices situated in different locations. For example, there is no protocol for enabling a consumer device at one's home to communicate with a consumer device at one's office. By the same token, there is no protocol for enabling a person's consumer device in a building's conference room facility to communicate with a consumer device in that person's office within the same building.

Therefore, a method is needed to facilitate communications between consumer devices where the consumer devices are located remotely from each other.

In addition, there is a need to extend the Service Discovery Transfer Protocol, disclosed in the above-referenced application, to allow for communications between remotely located consumer devices.

SUMMARY

The present invention is directed towards a system, a protocol and a method for one or more consumer devices at a first location to access the

services supplied by one or more consumer devices at a second location. In general, a consumer device at the first location must establish a connection with the a first server at the first location. Next, the first server must establish a network connection with a second server at the second location. Then, the second server at the second location must establish a connection with one of the consumer devices at the second location. In this way, a communications link is formed from a consumer device at a first location to a consumer device at a second location. Next, the consumer device at the first location requests a service to be performed by the consumer device at a second location where the consumer device at the first location communicates with the consumer device at the second location across the established communications link. Lastly, the consumer device at the second location performs the requested service on behalf of the request by the consumer device at the first location.

Therefore, it can be seen that the present invention facilitates communication between remotely located consumer devices by extending the functionality of the Service Discovery Transfer Protocol. These and other aspects, features, and advantages of the present invention will be set forth in the description that follows and possible embodiments thereof, and by reference to the appended drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a system diagram that illustrates an exemplary environment suitable for implementing various embodiments of the present invention.

Fig. 2 illustrates an exemplary environment in which an exemplary embodiment of the HATP protocol operates.

Fig. 3 is an exemplary sequential diagram showing the basic steps of an exemplary embodiment of the present invention.

Fig. 4 is an exemplary state diagram showing the basic operation of an exemplary embodiment of the present invention.

DETAILED DESCRIPTION

Before describing the details of the current invention, some terminology used herein is described. As used in the specification and claims of this invention, consumer devices include, but are not limited to: desktop computers, personal digital assistants (pda's), laptop computers, handheld computers, notebook computers, embedded processor devices, printers, fax machines, scanners, remote control units, X-10™ type electrical control devices, thermostats, electrical outlets, light switches, window controls, garage door systems, whole-house control systems, HVAC systems, security systems and devices, overhead projectors, slide projectors, movie projectors, video cassette recorders and players, compact disk players, DVD players, televisions, stereo systems and components including speakers, clocks, cellular and portable telephones, pagers (one-way and two-way), weather stations, and timekeeping systems. Those skilled in the art will realize that other consumer related devices may also take advantage of this invention and are included within the definition of consumer devices.

The term "protocol" generally refers to a set of formal rules or conventions describing how data is treated in an electronic system. In electronic communications, protocols define the electrical and physical standards to be observed, such as bit-ordering and byte-ordering and the transmission and error detection and correction of the bit messages, the client-server dialog, character sets, and sequencing of messages. Link protocols define the basics of how communication is established and maintained between two devices. Data protocols define how meaningful data is exchanged between the two devices using the link protocol as the underlying communication layer. Unless otherwise indicated, the term "protocol," as used below, refers to the data protocol employed by a given connection between two devices to communicate

meaningful data, such as the discovery of information about one device and the issuance of commands by one device to the other.

Referring now to the drawings, in which like numerals represent like elements throughout the several figures, aspects of the present invention and exemplary operating environments and embodiments will be described.

Fig. 1 is a system diagram that illustrates an exemplary environment suitable for implementing various embodiments of the present invention. Fig. 1 and the following discussion provide a general overview of a platform onto which the invention may be integrated or implemented. Although in the context of the exemplary environment the invention will be described as consisting of instructions within a software program being executed by a processing unit, those skilled in the art will understand that portions of the invention, or the entire invention itself, may also be implemented by using hardware components, state machines, or a combination of any of these techniques. In addition, a software program implementing an embodiment of the invention may run as a stand-alone program or as a software module, routine, or function call, operating in conjunction with an operating system, another program, system call, interrupt routine, library routine, or the like. The term program module will be used to refer to software programs, routines, functions, macros, data, data structures, or any set of machine readable instructions or object code, or software instructions that can be compiled into such, and executed by a processing unit.

Those skilled in the art will appreciate that the system illustrated in Fig. 1 may take on many forms and may be directed towards performing a variety of functions within a range of consumer devices, any of which may serve as an exemplary environment for embodiments of the present invention. The invention may also be practiced in a distributed computing environment where tasks are performed by remote processing devices that are linked through a

communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

The exemplary system illustrated in Fig. 1 includes a computing device **10** that is made up of various components including, but not limited to, a processing unit **12**, non-volatile memory **14**, volatile memory **16**, and a system bus **18** that couples the non-volatile memory **14** and volatile memory **16** to the processing unit **12**. The non-volatile memory **14** may include a variety of memory types including, but not limited to, read only memory (ROM), electronically erasable read only memory (EEROM), electronically erasable and programmable read only memory (EEPROM), electronically programmable read only memory (EPROM), electronically alterable read only memory (EAROM), and battery backed random access memory (RAM). The non-volatile memory **14** provides storage for power on and reset routines (bootstrap routines) that are invoked upon applying power or resetting the computing device **10**. In some configurations the non-volatile memory **14** provides the basic input/output system (BIOS) routines that are utilized to perform the transfer of information between the various components of the computing device **10**.

The volatile memory **16** may include a variety of memory types and devices including, but not limited to, random access memory (RAM), dynamic random access memory (DRAM), FLASH memory, EEROM, bubble memory, registers, or the like. The volatile memory **16** provides temporary storage for program modules or data that are being or may be executed by, or are being accessed or modified by the processing unit **12**. In general, the distinction between non-volatile memory **14** and volatile memory **16** is that when power is removed from the computing device **10** and then reapplied, the contents of the non-volatile memory **14** is not lost, whereas the contents of the volatile memory **16** is lost, corrupted, or erased.

The computing device **10** may access one or more internal or external display devices **30** such as a CRT monitor, LCD panel, LED panel, electro-luminescent panel, or other display device, for the purpose of providing information or computing results to a user. The processing unit **12** interfaces to each display device **30** through a video interface **20** coupled to the processing unit over system bus **18**.

The computing device **10** may have access to one or more external storage devices **32** such as a hard disk drive, a magnetic disk drive for the purpose of reading from or writing to a removable disk, and an optical disk drive for the purpose of reading a CD-ROM disk or to read from or write to other optical media, as well as devices for reading from and or writing to other media types including but not limited to, FLASH memory cards, Bernoulli drives, magnetic cassettes, magnetic tapes, or the like. The processing unit **12** interfaces to each storage device **32** through a storage interface **22** coupled to the processing unit **12** over system bus **18**. The storage devices **32** provide non-volatile storage for the computing device **10**.

The computing device **10** may receive input or commands from one or more input devices **34** such as a keyboard, pointing device, mouse, modem, RF or infrared receiver, microphone, joystick, track ball, light pen, game pad, scanner, camera, or the like. The processing unit **12** interfaces to each input device **34** through an input interface **24** coupled to the processing unit **12** over system bus **18**. The input interface may include one or more of a variety of interfaces, including but not limited to, an RS-232 serial port interface or other serial port interface, a parallel port interface, a universal serial bus (USB), an optical interface such as infrared or IrDA, an RF or wireless interface such as Bluetooth, or other interface.

The computing device **10** may send output information, in addition to the display **30**, to one or more output devices **36** such as a speaker, modem, printer,

plotter, facsimile machine, RF or infrared transmitter, or any other of a variety of devices that can be controlled by the computing device **10**. The processing unit **12** interfaces to each output device **36** through an output interface **26** coupled to the processing unit **12** over system bus **18**. The output interface may include one or more of a variety of interfaces, including but not limited to, an RS-232 serial port interface or other serial port interface, a parallel port interface, a universal serial bus (USB), an optical interface such as infrared or IrDA, an RF or wireless interface such as Bluetooth, or other interface.

The computing device **10** may operate in a networked environment using logical connections to one or more remote systems, such as a remote computer **38**. The remote computer **38** may be a server, a router, a peer device or other common network node, and typically includes many or all of the components described relative to the computing device **10**. When used in a networking environment, the computing device **10** is connected to the remote system **38** over a network interface **28**. The connection between the remote computer **38** and the network interface **28** depicted in Fig. 1 may include a local area network (LAN), a wide area network (WAN), a telephone connection, or the like. These types of networking environments are commonplace in offices, enterprise-wide computer networks, intranets and the Internet.

It will be appreciated that program modules implementing various embodiments of the present invention may be stored in the storage device **32**, the non-volatile memory **14**, the volatile memory **16**, or in a networked environment, in a remote memory storage device of the remote system **38**. The program modules may include an operating system, application programs, other program modules, and program data. The processing unit **12** may access various portions of the program modules in response to the various instructions contained therein, as well as under the direction of events occurring or being received over the input interface **24** and the network interface **28**.

Fig. 2 illustrates an exemplary environment in which an exemplary embodiment of the HATP protocol operates. As shown, the environment comprises a plurality of devices **210 & 240**, represented by circles. As used herein, "devices" include server devices, client devices, client/server devices **210 & 240**. In addition, gateway servers or Hidden Agent Transfer Protocol ("HATP") servers **220-230** are shown. The server devices are capable of providing one or more services or carrying out one or more functions. The client devices are capable of instructing the server devices to carry out a designated function or service via a communications link represented. A service could be an external operation, such as adjusting the temperature of a thermostat or switching the lights in a room on or off, or it might involve additional communication between the server device and the client device, such as sending a telephone number from a PDA to a laptop computer.

As illustrated in Fig. 2, a particular device may be both a server device and a client device such as client/server devices **210 & 240**. The client/server devices **210 & 240** may be capable of instructing other server devices to carry out a designated function while, at the same time, may carry out a function itself. For example, in its client role, a laptop computer might need to retrieve data from a PDA carried by a user, and then in its server role, the laptop might be called on by the user to provide a telephone number directly to a cellular telephone. Thus, the laptop functions as both a client device and a server device. However, in the following description, each device will be discussed only in its role as either a client device or a server device.

As illustrated in Fig. 2, gateway servers or HATP servers **220–230** interface to other HATP servers, client devices, server devices, and client/server devices. HATP facilitates an access point for devices to link across a network (internet/intranets), such that devices remotely scattered across a building, across a city, or across the world appear to each other to be in the same room

communicating over the link layer. HATP servers **220-230** act as both clients and servers to other devices. For those local devices wishing to access services from a remote device at a remote location, the HATP server proximate the local device appears to the local device as an SDTP server; whereas, the HATP server proximate the remote device appears to the remote device as an SDTP client. In the exemplary embodiment shown in Fig. 2, a two-way personal pager device **210** requests a first HATP server **220** to connect to a second HATP server **230** in order to use the services available from a security system device **240**. In this instance, the first HATP server **220** acts like an SDTP server device to the personal pager device **210**, and the second HATP server **230** appears to security system device **240** to be an SDTP client device.

HATP servers thus act as a gateway between remotely located SDTP devices. The HATP server implements two different protocols: when interfacing to SDTP devices, HATP servers utilize a HATP extension to the standard SDTP protocol described in the co-filed U.S. Application Serial No. __/_____, entitled, "Universal Protocol for Enabling a Device to Discover and Utilize the Services of Another Device;" and when interfacing to another HATP server, the HATP server utilizes the HATP protocol. Both the HATP extension to the SDTP protocol, and the HATP protocol are described in this specification.

A HATP server **220-230** typically resides on a personal computer and communicates with SDTP devices over the standard link layer. The HATP servers **220-230** communicate with each other over the Internet or over an intranet using TCP/IP protocol, also known as the network link. Of course, those skilled in the art will realize that other network protocols could be used to link one or more HATP servers **220-230** to each other.

As stated above, when connected to a device, a HATP server "looks" like a standard SDTP device implementation. When a device connects to a HATP

server, it will export services like an SDTP server. At least one service will be the HATP service. The HATP server has the following services available which serve as an extension of the SDTP protocol. Table 1 below outlines these services and their associated parameters.

Device	Device ID	Service	Service ID	Parameters
HATP Server	XYZ-HATP			
		Connect to another HATP server	XYZ-CONNECT	<network address> <userid> <password>
		Disconnect	XYZ-DISCONNECT	

Table 1

The local HATP server will reply to the local SDTP device with one of the following responses from Table 2:

Device	Device ID	Service ID	Response	Comments
HATP Server	XYZ - HATP			
		XYZ - CONNECT	XYZ - NOSERV	A connection to the server could not be established.
			XYZ - NOUSER	The user/password combination is not authentic.
			XYZ - OK	The connection is established.
			XYZ - ALREADY	A connection is already established with another server.
		XYZ - DISCONNECT	XYZ - DISCONNECT	

Table 2

The HATP protocol comprises at least three HATP commands that may be issued between HATP servers once a network link connection is established. One such command is the XYZ-USER command whereby the local HATP server requests the remote HATP server to verify that a user identification sent by the local SDTP device is valid. Another command is the XYZ-PWD command by which the local HATP server verifies from the remote HATP server that the password sent by the local SDTP device is valid for that user identification. Another command is the XYZ-TYPE command which requests the remote HATP server to return a list of ID's and SD's of SDTP devices with which the remote HATP server is in communication. Table 3 below illustrates these HATP commands and parameters.

Device	Device ID	Service	Service ID	Parameters
HATP Server	XYZ-HATP			
		Transfer the User ID	XYZ-USER	<userid>
		Transfer the password	XYZ-PASSWORD	<password>
		Get a list of IDs and services	XYZ-TYPE	

Table 3

The responses sent by the remote HATP server from requests by the local server are listed in Table 4 below.

Device	Device ID	Service ID	RESPONSE	COMMENTS
HATP Server	XYZ-HATP	XYZ-USER	XYZ-OK	<userid> is in the database of users
			XYZ-NOUSER	<userid> is not in the database of users
		XYZ-PASSWORD	XYZ-OK	<password> is valid for that <userid>
			XYZ-INVLDPW	<password> is invalid for that <userid>
		XYZ-TYPE		Returns a list of ID's and SD's in communication with the remote HATP server.

Table 4

Fig. 3 is an exemplary sequential diagram illustrating the basic steps of an exemplary embodiment of the present invention. It is important to note that this diagram is meant to depict only the basic functionality of the protocol and that actual use of the protocol will commonly involve a greater or lesser number of steps. Further, it is important to note that the steps shown and described do not all have to take place in the sequence shown. The sequence represents only a typical use of the available protocol functions which may or may not be followed in actual use.

As shown in Fig. 3, use of the protocol of the present invention does not begin until communication between a client **210** and a HATP server **220** is already established at Step **300** using a link protocol, also referred to as a link layer. The protocol of the present invention does not require the use of a specific link layer, but in an exemplary embodiment, the protocol may impose certain requirements such as: 1) allowing for serial ASCII data transfer; and 2)

if binary data is to be sent, using standard UUEncode/UUDecode routines to provide the proper conversions to and from ASCII data. Existing link layers which meet these requirements include, but are not limited to, serial cable, IrDA, Bluetooth and TCP/IP sockets.

If a device provides a service, it must be running a protocol server. Once a connection **300** using the link layer is complete, the HATP server **220** will identify itself as being capable of communicating using the protocol of the present invention by issuing a tag line message **302**. The issuance of the tag line message **302** signals the actual start of the operation of the protocol of the present invention. In an exemplary embodiment, the tag line message **302** and all subsequent messages are sent using standard 8-bit ASCII characters. In the illustrated embodiment, the tag line message **302** is in the following format:

PROTOCOLNAME VER:N.N [COMMENTS].

where PROTOCOLNAME is the name of the protocol, N.N is the current version of that protocol, and COMMENTS is an optional field which can be used to describe the manufacturer, the date of manufacture, or the like. As previously mentioned in referenced U.S. Application, Serial No. __/_____, Convergence Corporation has developed a universal protocol, called Service Discovery Transport Protocol ("SDTP") which embodies many of the aspects of this invention. Thus, in the example shown in Fig. 3, the SDTP-enabled server transmits the following tag line message:

SDTP VER:1.0 Conv. Corp. 1998.

Further description of the protocol of the present invention will focus on this specific, exemplary embodiment, but it should be understood that the present invention is not limited to the specifics of the SDTP protocol.

Once the HATP server **220** issues the tag line message **302**, the client **210** may request the HATP server **220** to identify the device types it supports and the services the HATP server **220** provides. This request is performed by

transmitting a type-command **304** to the HATP server **220**. The type-command could be implemented in a variety of forms, but in the illustrated embodiment, the type-command **304** comprises the word "TYPE." Although it is common for the client to send the type-command **304**, it should be understood that sending the type-command is not a required step. For example, a client may already be aware that a particular service is available from the server. Advantageously, this may save time in the communication process.

If the HATP server **220** receives the type-command **304**, the HATP server **220** transmits to the client **210** a data packet **306-312** describing the devices and services provided by the HATP server **220**. The data packet **306-312** contains several data fields. Among the data fields are one or more device/service identifiers **306-310**, each of which represents either a specific device type or a specific service type. For example a device type may include a thermostat, a door, a pager, a PDA or the like. A service type may include the ability to raise the temperature of a thermostat or to transmit the messages stored in a pager. In the preferred embodiment illustrated in Fig. 2 & Fig. 3, the device is a HATP server where the device/service identifier subsists in the following form:

$x_1x_2x_3$-NAME

where NAME may be a short (7 characters or less) description of the device or the service, and $x_1x_2x_3$ is a unique three character "identifier." Each of the three characters of the three character identifier is chosen from an alphabet consisting of the characters:

[0..9], [a..z], and [A..Z].

In addition, the x_1, x_2 and x_3 characters are chosen such that

$$(x_1 * x_2) + x_3$$

forms a unique value. This technique allows for 12161 unique device/services to be used under SDTP and HATP while at the same time only requiring 16-bit math to be used when describing a device or a service. Thus, the data packet

306-312 sent by the server device must include at least one device identifier **306**. In the example shown in Fig. 3, the device identifier is $X_{1A}X_{2A}X_{3A}$-HATP. In addition, because HATP servers support a variety of services, the device identifier **306** is followed by multiple service identifiers **308-310**. In the example shown in Fig. 3, the service identifiers are $X_{1B}X_{2B}X_{3B}$-CONNECT **308** and $X_{1C}X_{2C}X_{3C}$-DISCONNECT **310**.

In an exemplary embodiment, each individual device/service identifier **306-310** is sent as a single line of data and is limited to a maximum of 64 characters in length. Advantageously, this technique allows devices having a limited amount of RAM to receive and process a full line of data without facing an overflow condition. The end of a line of data is signaled by transmitting the ASCII carriage return and line feed characters. Upon transmission of the final device/service identifier **306-310** by the HATP server, the end of the response is signaled by transmitting an end of response message **312**. In an exemplary embodiment, an end of response message **312** includes the ASCII characters .<CR><LF>. Thus, the basic structure of a HATP server data packet sent in response to a type-command would be as follows:

ID: $X_{1A}X_{2A}X_{3A}$-HATP <cr><lf>

SD: $X_{1B}X_{2B}X_{3B}$-CONNECT <cr><lf>

SD: $X_{1C}X_{2C}X_{3C}$-DISCONNECT <cr><lf>

.<cr><lf>

Once the HATP server **220** has established a link with the client **210**, in the exemplary embodiment a pager, the pager may issue commands to the HATP server **220**. The CONNECT service request **314** is sent from the client **210** to the HATP server followed by the required parameters. The purpose of the CONNECT service is to request the local HATP server **220** to connect to a remote HATP server **230**; therefore, the parameters required for the CONNECT service include the network address of the remote HATP server **230** to which

the client **210** wishes to become connected, the user ID of the client **210**, and the password of the client **210**. The CONNECT request **314** consists of the CONNECT command followed by IP address 100.100.100.100, user identification "BOB", and password "0444."

Once the HATP server **220** receives the client's CONNECT request **314**, the HATP server **220** uses the appropriate protocol, TCP/IP or another protocol, to form a network link connection **332** with the remote HATP server **230**. When the network link connection **332** is established between the two HATP servers **220 and 230**, the HATP server **230** at the remote location, shown as an office PC, sends forth to the HATP server **210** at home a tag line message **334**. In an exemplary embodiment, the tag line message **334** and all subsequent messages are sent using standard 8-bit ASCII characters. In the illustrated embodiment, the tag line message **334** is in the following format:

PROTOCOLNAME VER:N.N [COMMENTS].

where PROTOCOLNAME is the name of the protocol, N.N is the current version of that protocol, and COMMENTS is an optional field which can be used to describe the manufacturer, the date of manufacture, or the like. Thus, in the example shown in Fig. 3, the HATP server **230** transmits the following tag line message:

HATP VER:1.0 Conv. Corp. 1998.

The HATP server **220** will next send the user command **336** to the HATP server **230**. In this case, the USER command **336** includes the parameter "BOB" because this is the user name that client **210** sent as the user ID parameter of its connect command **314**. HATP server **230** will check its database of registered user ID's to ensure that "BOB" is a registered user identification. In this example, "BOB" is a registered user identification, so the HATP server **230** responds to HATP server **220** by issuing the OK response **338**. The HATP server **220** will then send the password command (PWD) **340**

to the HATP server **230**. The parameter following the password command **340** is the password which the SDTP client sent as a parameter with its connect command **314** to the HATP server **220**. The HATP server **230** will check this password against that stored within its internal database as the appropriate password for BOB and, if this password is correct, will respond with OK **342**. The HATP server **220** upon receiving the OK **342** response from the HATP server **230** will then initiate an OK response **344** to the client **210**. This OK response allows the client **210** to verify the connection was made between the two HATP servers **220 and 230**.

From this time until a DISCONNECT command is sent from the client **210** to its local HATP server **220**, all remote SDTP devices which have an established link layer with the remote HATP server (a) will appear to the local SDTP device to be located locally and (b) will respond to any service requests initiated from the local SDTP device. In the exemplary embodiment of Fig. 2 and Fig. 3, a security system **240** is remotely located at the site of the remote HATP server **230**. At some earlier point in time, the security system **240** established a link **316** with the HATP server **230**. The HATP server **230** issued a TYPE command **320** to the security system **240**. The security system **240** responded with its ID and services **322-330**. In this example, the response consisted of the following services STAT **324**, ON **326**, and OFF **328**. While this example, for illustration, shows only a single SDTP device, multiple SDTP devices could have established links with the HATP server **230**.

While not required for the local client to access services from the remote server or servers, a local client will usually initiate a TYPE command **346** to interrogate the services available to the local client through the remote HATP server **230**. When the local HATP server **220** receives the SDTP TYPE command **346**, it sends the HATP TYPE command **348** to the remote HATP server. The remote HATP server **230** will respond with its own ID and

associated services **350**, **354**, **358**, as well as all ID's and services **230, 362**, **366**, **370**, **374 and**, **378** for SDTP devices in communication over the link layer **316** with the remote HATP server. As the local HATP server **220** receives these responses to the HATP TYPE command **348** from the remote HATP server **230**, the local HATP server **220** passes these responses on to the client **210** by transmission of the various commands **352**, **356**, **360**, **364**, **368**, **372**, **376**, and **380**.

At this point, the local client device **210**, in the illustrated embodiment a two-way pager, may seek to access services from the remote server device **230**. For example, the local client device **210** may issue the STAT command **382** to seek the status of the alarm system at the office. The local HATP server **230** will relay this command to the remote HATP server **230** by issuing the STAT command 384 which will in turn relay this service to the remote server **240** by issuing the STAT command **386**. The remote server device, security system, will determine its status, in this case ARMED, and send this information back to the remote HATP server **220** by replying with the response ARMED **388**. The remote HATP server **230** will forward the armed response **390** to the local HATP server **220** which will in turn respond to the local client **210** with the ARMED response **392**. Through the mechanism described above, a local client device can access services from a remote server device.

Fig. 4 is a useful state diagram of the operation of a typical HATP server running the HATP extended SDTP protocol and the HATP protocol. Upon powerup, the HATP server enters a READY state **400**. From this READY state **400**, several events may trigger action by the HATP server. If an SDTP device establishes a link layer with the HATP server and a new link is established **405**, the HATP server will issue the TYPE command **410** to inventory the services available from the SDTP devices linked to the HATP server. If the SDTP devices are server or client/server devices, they will respond to the TYPE

command **410** with a TYPE response **420** consisting of their ID's and SD's (available services). The HATP server will store this inventory of available services in a database for future reference and return to the READY state **400**. If the new SDTP devices are only client devices, there will be no response **415** from the new client devices, and the HATP server will return to its READY state **400**.

Also from READY state **400**, the HATP server may receive a TYPE command **425** from any SDTP devices that have established a link layer with the HATP server. The HATP server would then respond with its own ID of HATP and a listing of its available services: CONNECT & DISCONNECT.

From READY state **400**, the HATP server may receive a link layer CONNECT request **435** from an SDTP device. The HATP server will verify **440** that the user identification and password are valid for the remote HATP server with which the SDTP device requests the connection to be made. If the user identification/password combination is not valid or if a connection with another remote HATP server has already been established, the connection will fail **445** and the HATP server will return to its READY state **400**. If the user identification/password combination is valid and there is not a connection already established, the HATP server will change to its CONNECTED AS LOCAL state **450**.

From the CONNECTED AS LOCAL state **450**, the HATP server acts as a local gateway through a remote HATP server to remote SDTP servers. If the HATP server receives a TYPE command **452** from the local SDTP device, the HATP server will query the remote HATP server for a listing of ID's and SD's available from remote SDTP devices. It will then respond **454** with this listing to the local SDTP device that issued the query and return to the CONNECTED AS LOCAL **450** state.

From the CONNECTED AS LOCAL state **450**, the HATP server may receive a service request **456** from the local SDTP device to access a service found at a remote SDTP device. The HATP server will pass this service request **458** to the remote HATP server, and await response **460**. After the response is received at the local HATP server, the local HATP server will reply to the client **462** by relaying the response received from the remote HATP server and then return to the CONNECT **450** state..

The HATP server may also receive a DISCONNECT command **464** from the local SDTP device after which it will disconnect **466** from the remote HATP server and return to READY state **400**.

From READY state **400**, the HATP server may receive a network layer CONNECT request **468** from another HATP server. The HATP server will verify **470** that the user identification and password is valid. If the user identification/password combination is not valid or if a connection with another HATP server has already been established, the connection will fail **472** and the HATP server will return to its READY state **400**. If the user identification /password combination is valid and there is not a connection already established, the HATP server will change to its CONNECTED AS REMOTE state **474**.

From CONNECTED AS REMOTE state **474**, the HATP server acts as a remote gateway from which a local HATP server will access remote SDTP servers. If the HATP server receives a TYPE command **476** from the local HATP server, it will then respond **478** to the local HATP server that issued the query with a listing of ID's and SD's available from remote server devices and return to the CONNECTED AS REMOTE **474** state.

From CONNECTED AS REMOTE state **474**, the HATP server may receive a service request **480** from the local HATP server to access a service found at a remote SDTP device. The HATP server will pass this service request **482** to the remote SDTP server, and await response **484**. After the response is

received at the HATP server, the remote HATP server will reply to the local HATP server **486** by relaying the response received from the remote SDTP server.

The HATP server may also receive a DISCONNECT command **488** from the local HATP server after which it will disconnect **490** from the local HATP server and return to READY state **400**.

From the foregoing description, it will be appreciated that the present invention provides a system, a protocol and a method for facilitating communication between various remotely located, consumer devices and enabling the consumer devices to share features, functionality and information. Although the present invention has been described using various examples and command formats, it will be appreciated that the present invention is not limited by these examples.

The present invention may be implemented and embodied in a variety of devices and may be implemented in software or hardware. In addition, the operation, steps and procedures of the present invention may be implemented in a variety of programming languages. The specification and the drawings provide an ample description of the operation, steps and procedures of the present invention to enable one of ordinary skill in the art to implement the various aspects of the present invention.

The present invention has been described in detail with particular reference to exemplary embodiments. It is understood that variations and modifications can be effected within the spirit and scope of the invention, as described herein before, and as defined in the appended claims. The corresponding structures, materials, acts, and equivalents of all means or step plus function elements in the claims below are intended to include any structure, material, or acts for performing the functions in combination with other claimed elements as specifically claimed.

CLAIMS

What is claimed is:

1. A method for a first device to access the services of a second device, comprising the steps of:

establishing a first, communicative connection between the first consumer device and a first server;

establishing a second communicative connection between the first server and a second server;

establishing a third, communicative connection between the second server and the second device;

requesting a service, by the first device, from the second device utilizing the first, second, and third communicative connections; and

performing, at the second device, the requested service.

2. The method of claim 1 wherein the step of establishing the second communicative connection further comprises the step of verifying that the first device has authorization to establish the second communicative connection.

3. The method of claim 1 further comprising, after the performing step, the step of sending from the second device to the first device the status of the performing step.

4. The method of claim 1 further comprising, after the establishing a second communicative connection step, the step of reporting to the first device a listing of services available from the second device.

5. The method of claim 1 wherein the establishing a first communicative connection step comprises the step of establishing a wireless communicative connection between the first device and a first server.

6. The method of claim 1 wherein the establishing a third communicative connection step comprises the step of establishing a wireless communicative connection between the second device and the second server.

7. An apparatus implementing the method of claim 1.

8. A server device that is capable of communicating over a first communications link with a client device and over a second network link to a second server device comprising:

a communications link interface for communicating between the server device and the client device;

a network interface for communicating between the server device and a second server device;

a processing unit, being operable to send and receive data over the communications link interface and over the network interface, said processor being further operable to:

establish a communications link for data communication through the link interface with a client device;

establish a network link for data communication through the network interface to the second server device;

forward service requests from the client device to the second server device; and

forward responses to the service requests from the second server device to the client device.

9. The server device of claim 8 wherein the communications link is a wireless interface.

10. A method for a first client device to access the services supplied by a second client device, comprising the steps of:

establishing a first link between the first client device and a first server;

transmitting a connection command over the first link to the first server, the connection command being operative to request a connection with a second server and comprises an address of the second server, a user identification, and a password;

establishing a second link between the first server and a second server;

transmitting the connection command over the second link from the first server to the second server;

verifying the authorization of the user identification and password at the second server;

notifying the first server over the second link from the second server of the acceptance of the connection command upon success of the verifying step;

notifying the first client device from the first server over the first link of the acceptance of the connection command;

requesting a listing from the first server of available services from the second client device wherein the first server requests such a listing from the second server, the second server maintaining such a listing from the second client device which is communicatively coupled to the second server over a third link, and the listing identifying at least one service offered by the second client device;

the first consumer device requesting a service from the listing to be performed by the second client device by relaying a service request to the second client device;

performing the service requested in the service request by the second client device.

11. An apparatus implementing the method of Claim 10.

12. A data structure for use in a communication protocol, the data structure having a plurality of data fields for representing data, comprising:

a first data field comprising:

data representing a three letter identification code unique to a particular device type; and

data representing a server type; and

a second data field comprising:

data representing a three letter identification code unique to a particular service type; and

data representing service types.

13. The data structure of claim 12 wherein the first data field further comprises optional data comprising comments.

14. The data structure of claim 12 wherein the data representing service types in the second data field is selected from the group consisting of "CONNECT" and "DISCONNECT".

15. The data structure of claim 12 wherein the second data field further comprises data comprising parameters.

16. A system for allowing devices to communicate and share information, resources, and functionality, that normally could not communicate due to the inability to communicate directly with each other, the system comprising:

a local server able to communicatively couple to a local device;

a remote server able to communicatively couple to a remote device and to the local server;

the local server being operative to:

receive a service request from the local device;

provide a request message to the remote server of the reception and content of the service request;

receive a response message from the remote server, the response message being affiliated with the request message; and

respond to the local device with information indicative of the response message; and

the remote server being operative to:

receive the request message from the local server;

perform further processing commensurate with the request message; and

provide the response message to the local server.

17. The system of claim 16, wherein the service request from the local device comprises a request to establish a logical connection between the local device and the remote server and includes an IP network address of the remote server.

18. The system of claim 16, wherein the service request from the local device comprises a request to establish a logical connection between the local device and the remote server.

19. The system of claim 18, wherein the service request from the local device further includes a user identification and a password, and the local server is operative to provide the request message to the remote server and receive a response message from the remote server by:

establishing a link with the remote server;

transmitting the user identification to the remote server;

receiving a first status indicator from the remote server in response to the user identification;

transmitting the password to the remote server; and

receiving a second status indicator from the remote server in response to the password.

20. The system of claim 19, wherein after establishing a link with the remote server, the local server receives a message from the remote server indicating that the remote server is communicatively compatible with the local device.

21. The system of claim 19, wherein the first status indicator indicates that the user identification is not accepted by the remote server.

22. The system of claim 19, wherein the first status indicator indicates that the user identification is accepted by the remote server.

23. The system of claim 19, wherein the second status indicator indicates that the password provided is valid for the user identification.

24. The system of claim 19, wherein the second status indicator indicates that the password provided is invalid for the user identification.

25. The system of claim 19, wherein the local server is operative to respond to the local device with information indicative of the response message by being further operative to:

provide a first response if the response message indicates that the logical connection could not be established;

provide a second response if the response message indicates that the user identification and password are not both acceptable by the remote server;

provide a third response if the response message indicates that the logical connection is established; and

provide a fourth response if the response message indicates that a logical connection already exists with another server.

26. The system of claim 16, wherein the service request message from the local device comprises a request to disconnect a logical connection between the local device and the remote server.

27. The system of claim 16, wherein the service request from the local device comprises a request to disconnect a logical connection between the local device

and the remote server, and the local server is operative to provide the request message to the remote server by:

transmitting to the remote server, a request to disconnect the logical connection between the local device and the remote server; and

receiving a status indicator from the remote server indicating that the logical connection is disconnected.

28. The System of claim 16, wherein the service request message from the local device comprises a request for the remote device to provide a service.

29. The System of claim 16, wherein the service request message from the local device comprises a request for the remote server to identify a device type and a service type for at least one remote device that can be communicatively coupled to the remote server.

30. The System of claim 16, wherein the service request message from the local device comprises a request for the remote device to provide a service and the remote device is operative to perform further processing commensurate with the request message from the local server by requesting the remote device to perform the service identified in the service request and the request message.

ABSTRACT

A method for a first device to access the services supplied by a second device by establishing a communicative connection between the first consumer device and a first server. The first server, establishes a communicative connection between the first server and a second server. The second server establishes a communicative connection between the second server and the second device. Once the communicative connection are established, a service request can be sent from the first device, to the second device utilizing the communicative connections. In response to receiving the request the second consumer device can perform the requested service.

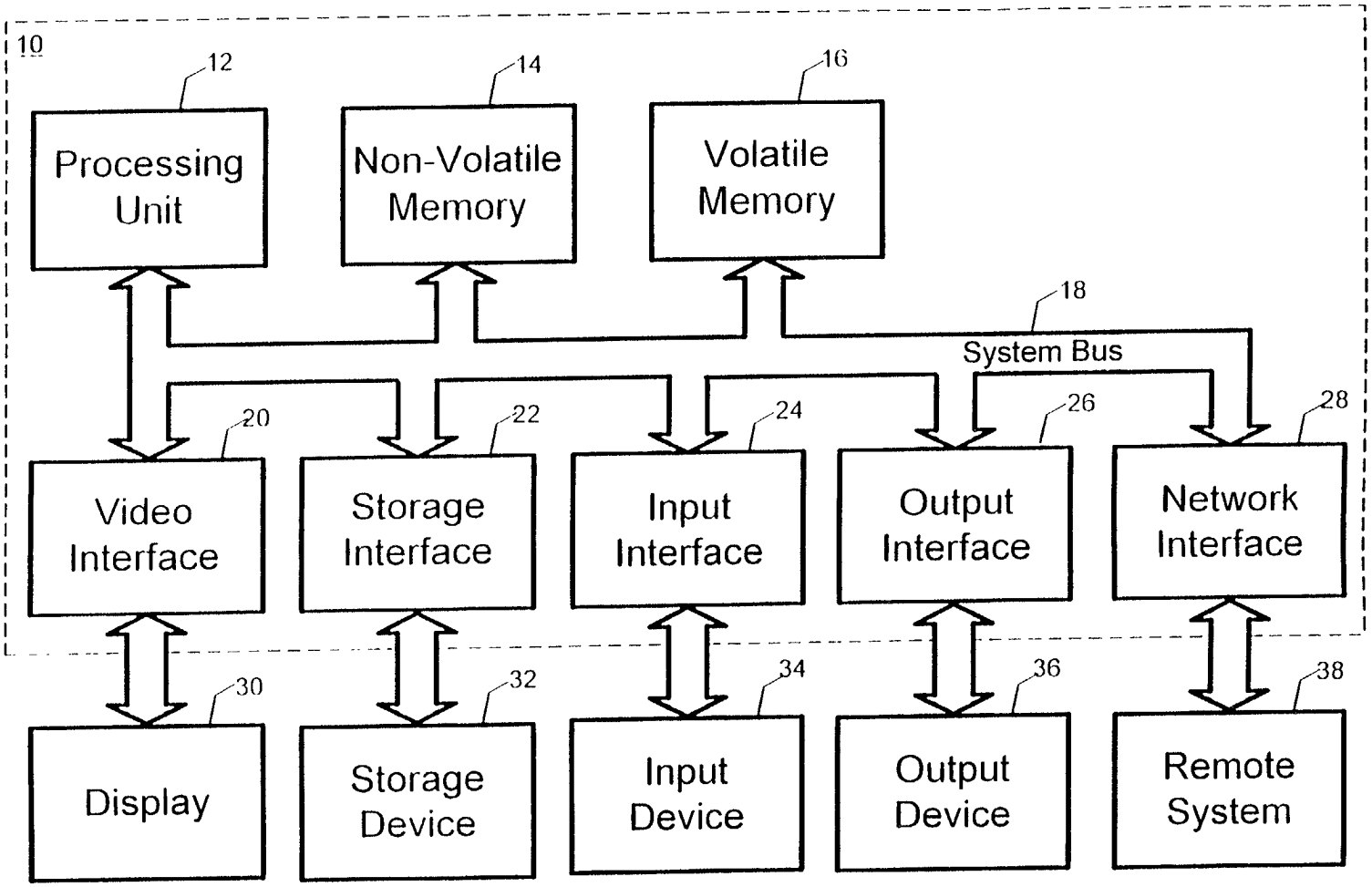
10
12
Processing Unit
14
Non-Volatile Memory
16
Volatile Memory
18
System Bus
20
Video Interface
22
Storage Interface
24
Input Interface
26
Output Interface
28
Network Interface
30
Display
32
Storage Device
34
Input Device
36
Output Device
38
Remote System

Fig. 1

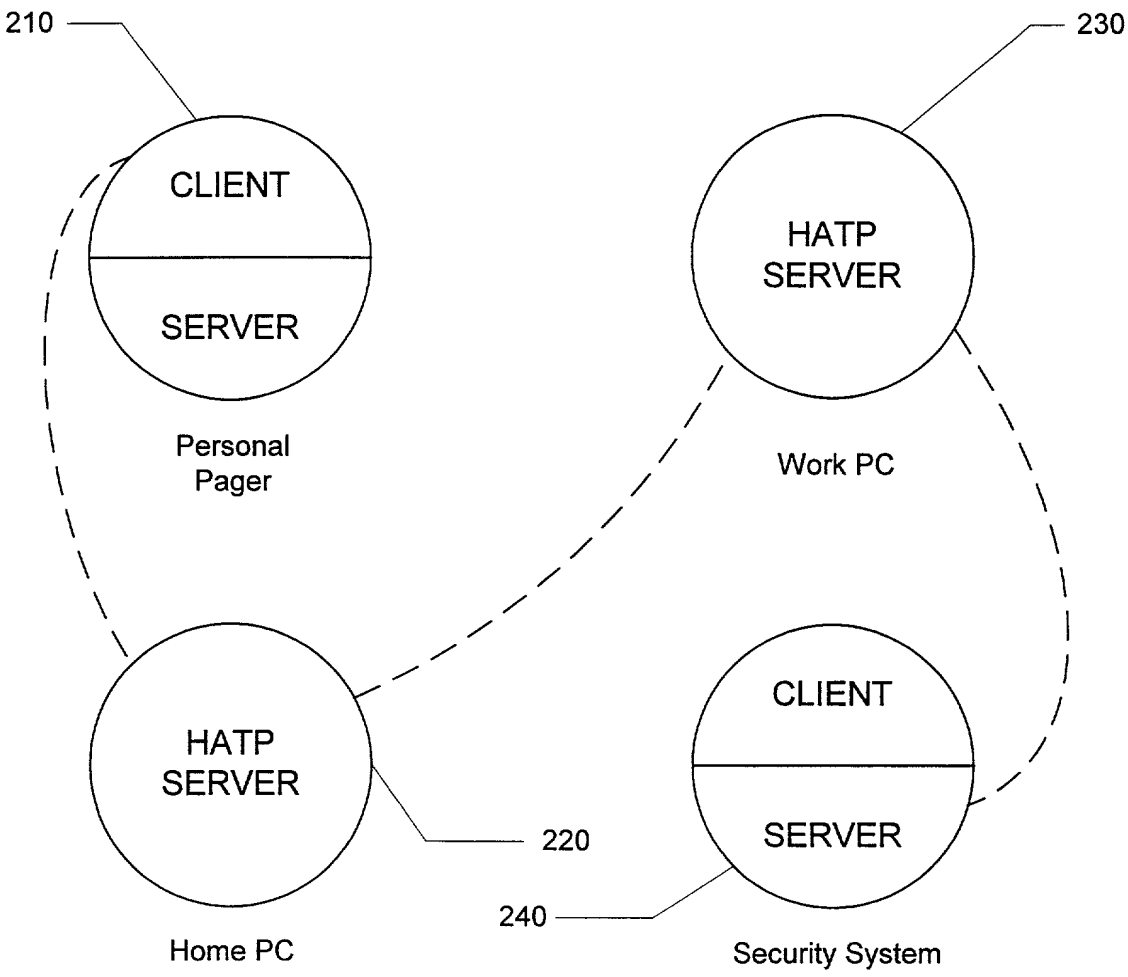
210
230
CLIENT
SERVER
HATP
SERVER
Personal
Pager
Work PC
HATP
SERVER
220
CLIENT
SERVER
240
Home PC
Security System

FIG. 2

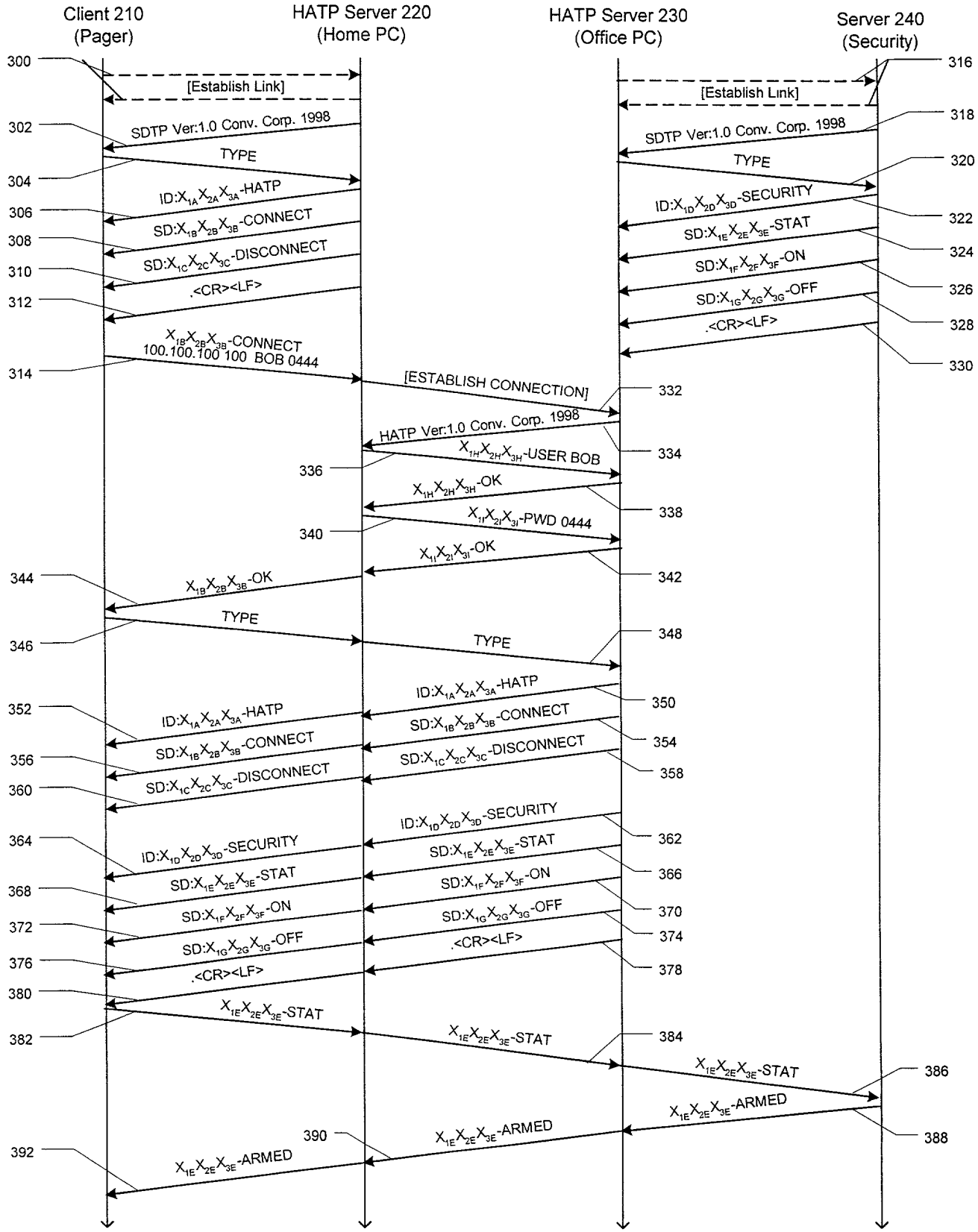
Client 210
(Pager)
HATP Server 220
(Home PC)
HATP Server 230
(Office PC)
Server 240
(Security)
300
[Establish Link]
316
[Establish Link]
302
SDTP Ver:1.0 Conv. Corp. 1998
318
SDTP Ver:1.0 Conv. Corp. 1998
304
TYPE
320
TYPE
306
ID:X1AX2AX3A-HATP
ID:X1DX2DX3D-SECURITY
322
308
SD:X1BX2BX3B-CONNECT
SD:X1EX2EX3E-STAT
324
310
SD:X1CX2CX3C-DISCONNECT
SD:X1FX2FX3F-ON
326
312
.<CR><LF>
SD:X1GX2GX3G-OFF
328
.<CR><LF>
330
314
X1BX2BX3B-CONNECT
100.100.100.100 BOB 0444
[ESTABLISH CONNECTION]
332
HATP Ver:1.0 Conv. Corp. 1998
334
X1HX2HX3H-USER BOB
336
X1HX2HX3H-OK
338
X1IX2IX3I-PWD 0444
340
X1IX2IX3I-OK
342
344
X1BX2BX3B-OK
TYPE
346
TYPE
348
ID:X1AX2AX3A-HATP
350
352
ID:X1AX2AX3A-HATP
SD:X1BX2BX3B-CONNECT
354
SD:X1BX2BX3B-CONNECT
356
SD:X1CX2CX3C-DISCONNECT
SD:X1CX2CX3C-DISCONNECT
358
360
ID:X1DX2DX3D-SECURITY
362
364
ID:X1DX2DX3D-SECURITY
SD:X1EX2EX3E-STAT
366
SD:X1EX2EX3E-STAT
368
SD:X1FX2FX3F-ON
SD:X1FX2FX3F-ON
370
372
SD:X1GX2GX3G-OFF
SD:X1GX2GX3G-OFF
374
.<CR><LF>
376
.<CR><LF>
378
380
X1EX2EX3E-STAT
382
X1EX2EX3E-STAT
384
X1EX2EX3E-STAT
386
X1EX2EX3E-ARMED
388
390
X1EX2EX3E-ARMED
392
X1EX2EX3E-ARMED

FIG. 3

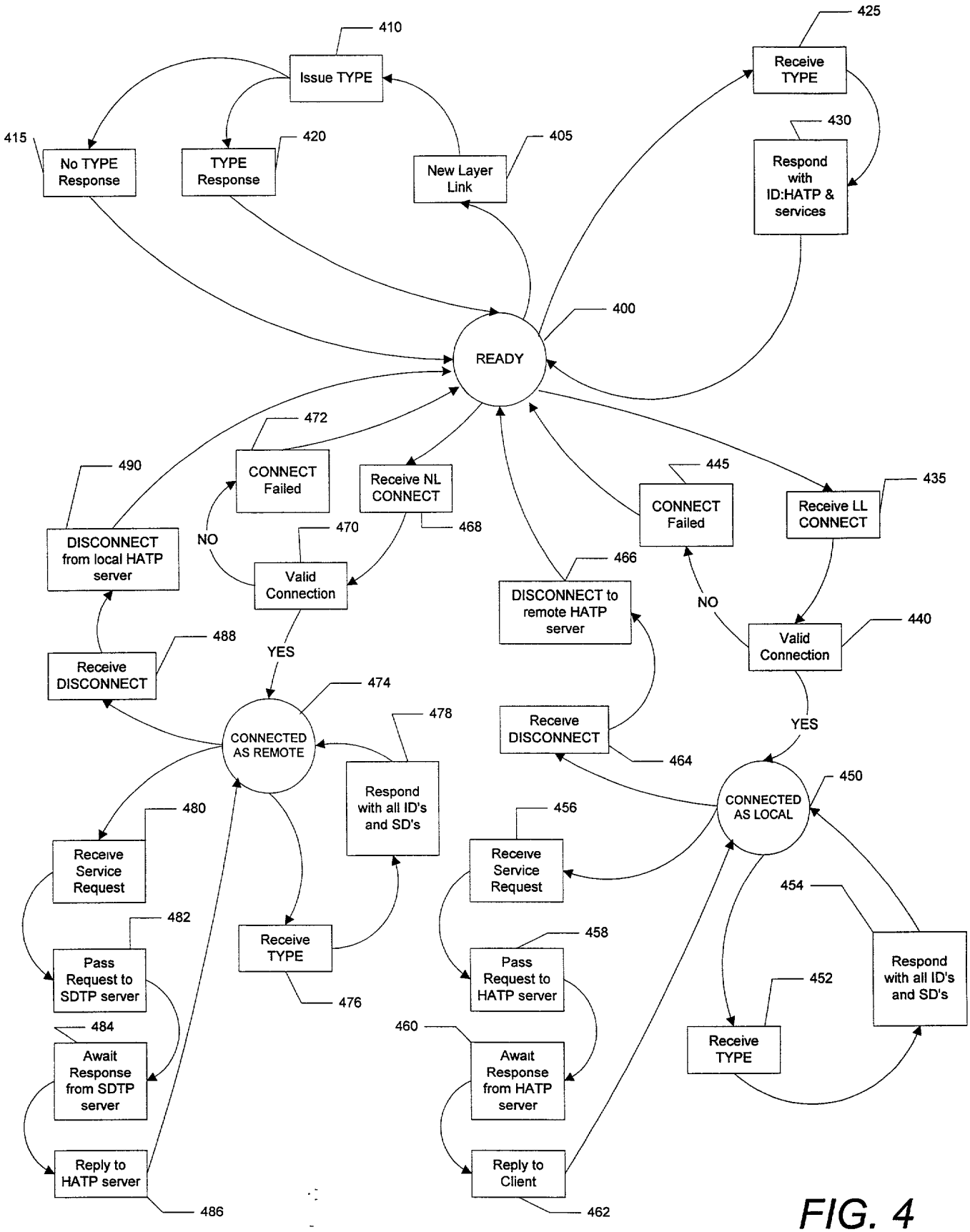
410
Issue TYPE
425
Receive TYPE
415
No TYPE Response
420
TYPE Response
405
New Layer Link
430
Respond with ID:HATP & services
400
READY
472
CONNECT Failed
490
DISCONNECT from local HATP server
Receive NL CONNECT
445
CONNECT Failed
435
Receive LL CONNECT
NO
470
Valid Connection
468
466
DISCONNECT to remote HATP server
NO
440
Valid Connection
488
Receive DISCONNECT
YES
474
478
CONNECTED AS REMOTE
Receive DISCONNECT
464
YES
450
CONNECTED AS LOCAL
480
Receive Service Request
Respond with all ID's and SD's
456
Receive Service Request
454
Respond with all ID's and SD's
482
Pass Request to SDTP server
Receive TYPE
476
458
Pass Request to HATP server
452
Receive TYPE
484
Await Response from SDTP server
460
Await Response from HATP server
Reply to HATP server
486
Reply to Client
462

FIG. 4

In Re Application:
DECLARATION AND POWER OF ATTORNEY

Attorney's Docket No. 8406.97515

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am an original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled: **HIDDEN AGENT TRANSFER PROTOCOL**, the specification of which:

☒ is attached hereto.
was filed on _____ as Application No. _____ (if applicable) and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I do not know and do not believe that the same was ever known or used by others in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to the date of this application. I further state that the invention was not in public use or on sale in the United States of America more than one year prior to the date of this application. *I understand that I have a duty of candor and good faith toward the Patent and Trademark Office,* and I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 (a)-(d) of the foreign application(s) for patent or inventor's certificate listed below, and have also identified below any foreign application for patent or inventor's certificate disclosing subject matter in common with the above-identified specification and having a filing date before that of the application on which priority is claimed:

Application No.	Country	Filing Date	Priority Claimed Under 35 USC §119
None			Yes_____No_____

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter disclosed and claimed in the present application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial No.	Filing Date	Status: patented, pending, abandoned
None		

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statement were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

POWER OF ATTORNEY: The following attorneys are hereby appointed to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: GREGORY S. SMITH, REG NO. 40,819; R. STEVAN COURSEY, REG. NO. 39,949; JOEL S. GOLDMAN, REG. NO. 29,070; GERALD R. BOSS, REG. NO. 36,460; JAMES D. WRIGHT, REG. NO. P43,291; ROGER S. WILLIAMS, REG. NO. P43,273; KENNETH SOUTHALL, REG. NO. 38,315; WILLIAM B. DYER III, REG. NO. 41,725.

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